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with quartz sand. While not yet completed, this investigation has already shown that a rich adobe (clay) soil, as well as an equally rich sandy soil, diluted to an extent of four to one, shows equally good growth, but that when in these soils the dilution reaches five to one, development is quite slow, and in a short season would mean a crop failure. The moisture content was in all these cases maintained at one half the maximum water capacity of each diluted soil. Photographs show clearly that here the roots made up by their extension for the lack of concentration of the food supply; but at the dilution of one to five they were unable to make up that deficiency, at least within a reasonable time, although the same total *amount* of food ingredients was always present in the increased bulk. Other things being equal, it is the *proportion*, then, between the several soil ingredients, quite as much as the absolute quantity at hand, that determines production. Incidentally, this experiment shows the wide variation of physical composition (from a soil containing 35 per cent. of colloidal clay to one with only 8.75 per cent., and in the sandy soil from 7.6 per cent. to 1.9 per cent.) within which plants will do equally well, provided the plant food ingredients are rightly proportioned; and provided also that a proportionally large soil mass is available to each plant.

In the foregoing discussion, only the salient points of the bulletin in question have been taken up, and their most obvious weaknesses briefly considered. To do more would involve the writing of a paper as long as the bulletin itself; and it is to be hoped that the matter will be taken up by others, also. Thus, for instance, the Rothamstead Station might have something to say regarding the singular interpretation here put upon the splendid work of Lawes and Gilbert.

In conclusion, it seems to the writer that the verdict upon the main theses put forward so confidently in this paper must be an emphatic 'Not proven!'

E. W. HILGARD.

BERKELEY, CALIFORNIA,  
November 11, 1903.

#### ABSORBED GASES AND VULCANISM.

To THE EDITOR OF SCIENCE: The descriptions of the spine of Mont Pelé by Hovey and Heilprin remind me of the phenomenon I observed some ten years ago, when my mind was on the subject of the part which the original absorbed gases play in vulcanism, as discussed in my paper in the *Bulletin of the Geol. Soc. Am.*, March 3, 1894. I had a bottle of Werner's grape milk packed in the place of the tin of an ice cream freezer, the same having served its purpose, in order to cool it. I presume any other carbonated beverage would work similarly. Though chilled well below 0° C. the beverage remained clear and unfrozen, as long as it was corked, but upon removing the cork the gas began to escape and freezing to set in rapidly. Sometimes nearly the whole contents of the bottle would freeze. Upon one occasion, however, I remember seeing a 'volcanic plug' of frozen matter forced out in a round cylinder from the neck.

I am inclined to think that there may be a very close analogy with the Mont Pelé spine. I think it would not be very difficult to reproduce this phenomenon, though I can not tell the exact temperature at which it occurred.

ALFRED C. LANE.

#### SHORTER ARTICLES.

##### THE HEREDITY OF 'ANGORA' COAT IN MAMMALS.

THAT Mendel's law is a fundamental principle of heredity becomes daily clearer as new illustrations of its workings come to light, either through a reexamination of the older observations on heredity or through the performance of new experiments. One of these new illustrations it is the purpose of this note briefly to describe.

The writer has already pointed out, in the columns of SCIENCE, two pairs of alternative, or Mendelian, characters pertaining to the hairy coat of guinea-pigs. (1) A pigmented coat of any sort is dominant over an unpigmented, or albino, coat. Accordingly when a pure-bred pigmented guinea-pig is mated to an albino, the young are invariably pigmented. (2) The rough, or 'rosetted,' condition of coat found in so-called Abyssinian and Peru-

vian guinea-pigs is dominant over the normal, or smooth-coated, condition.

To these two pairs of Mendelian characters we may now add a third: 'Angora,' or long coat, is recessive with respect to the normal short coat. This fact was first discovered accidentally when a number of long-haired young were obtained by inbreeding a stock of short-haired guinea-pigs supposedly pure. A parallel result was obtained in the case of rabbits. Two rabbits, brother and sister, whose ancestors for at least two generations were known to have been short-haired, produced, in a litter of six young, two long-haired, or 'Angora,' individuals.

As a result of experiments subsequently made, it may now be said that, in the case of guinea-pigs and rabbits (and probably in other mammals also):

(1) Two long-haired animals of whatever ancestry produce only long-haired young; (2) a short-haired animal of pure stock, mated to a long-haired animal, produces offspring all short-haired; (3) a short-haired animal, one of whose parents was long-haired, when mated to a long-haired animal produces offspring, some short-haired, others long-haired, the two sorts occurring in approximately equal numbers; (4) two hybrid short-haired animals (like the one described under 3) when mated to each other produce long-haired and short-haired offspring approximately in the ratio, 1:3. These various facts agree in showing that short coat is 'dominant' in heredity over long or Angora coat.

The writer recalls seeing in the daily press some months ago a brief despatch (which unfortunately he did not preserve) recording the exportation (to Hagenbeck, he thinks) of the 'last of the Oregon Wonder horses,' which had mane and tail fourteen feet long. A short account, which was given, of the ancestry of this abnormally long-haired horse suggested to the writer that the long-haired character was in this case, as in rabbits and guinea-pigs, inherited as a recessive, and that the so-called 'last' of the long-haired horses need not have been such had the owner been familiar with the scientific principles of breeding. If any reader of SCIENCE can give

further information about these long-haired Oregon horses, the writer would be very grateful to receive it. It seems to him extremely probable that in mammals in general an abnormally long coat behaves as a recessive character in heredity, when brought by cross-breeding into competition with the normal coat character. If so, this fact makes clear some matters which have been hitherto obscure and which have received a different but hardly satisfactory explanation. Thus Darwin attributes to the direct influence of the climate the long-haired coat character of the goats, shepherd-dogs and cats of Angora, and states on authority that the Karakool breed of sheep lose their peculiar fine, curled fleece when removed from their native canton near Bokhara. It is clear that a long-haired breed of animals would apparently lose that character completely and immediately, if allowed to cross with other breeds, as would likely be the case upon removal to a new locality. Yet this loss would occur irrespective of any climatic influence.

It is hoped that the facts here communicated may prove of some value to breeders of sheep and goats, such as are kept primarily for the fleece, as well as to breeders of pet stock. May we not work more intelligently for the improvement of our flocks, knowing the conditions under which the long-haired coat is transmitted?

W. E. CASTLE.

ZOOLOGICAL LABORATORY,  
HARVARD UNIVERSITY,  
November 23, 1903.

#### CONCERNING MOSQUITO MIGRATIONS.

IN the pages of SCIENCE I have recorded from time to time the results of my observations upon the habits of the ring-legged salt marsh mosquito, *Culex sollicitans*, and have expressed my conviction that it was a migratory form; limited in its breeding areas, but widely distributed and dominant for long distances away from them. In my study of the problem as it exists in New Jersey, this migration question is of the utmost importance, since local work can never be entirely effective if the mosquito supply comes from a place beyond the range of local jurisdiction. It is